Ozone/Nitrogen dioxide EnviroceL® Specification

A3OZ EnviroceL®

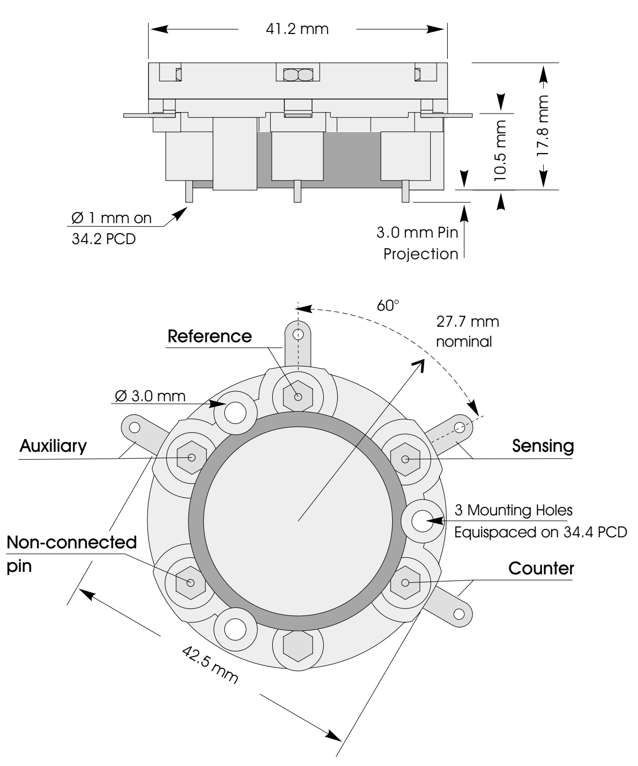
This sensor is one of a range for monitoring gases at levels found in the environment. It is designed to give accurate readings of O_3 or NO_2 in ambient air.

Performance Characteristics

Nominal Range	0-10ppm
Maximum Overload	100ppm
Expected Operating Life	Two years
Output Signal	2.2 ± 0.5 µA/ppm
Resolution at 20°C	20ppb
Temperature Range	-20°C to +50°C
Pressure Range	Atmospheric ± 10%
Pressure Coefficient	No data
T_{90} Response Time	<40 seconds
Relative Humidity Range	15 to 90% non-condensing
Typical Baseline Range (pure air)	0 to 0.1ppm equivalent
Maximum Zero Shift (+20°C to +40°C)	0.1ppm equivalent
Typical Long Term Output Drift	<10% signal loss/year in air
Recommended Load Resistor	33Ω
Bias Voltage	Not required
Repeatability	1% of signal
Output Linearity	Linear

N.B. All performance data is based on conditions at 20°C, 50%RH, and 1013mBar

Outline Dimensions



All tolerances ±0.15mm unless otherwise stated.
A3OZ shown with side tags and gold pins.
Do not solder to pin connections

Physical Characteristics

Material	Polycarbonate
Weight	22g
Position Sensitivity	None
Storage Life	Six months in CTL container
Recommended Storage Temperature	0-20°C
Warranty Period	12 months from date of despatch

Cross-Sensitivity Data

Carbon monoxide	None
Nitrogen Dioxide	100%
Chlorine	100%
Sulphur Dioxide	None
Hydrogen Sulphide	None

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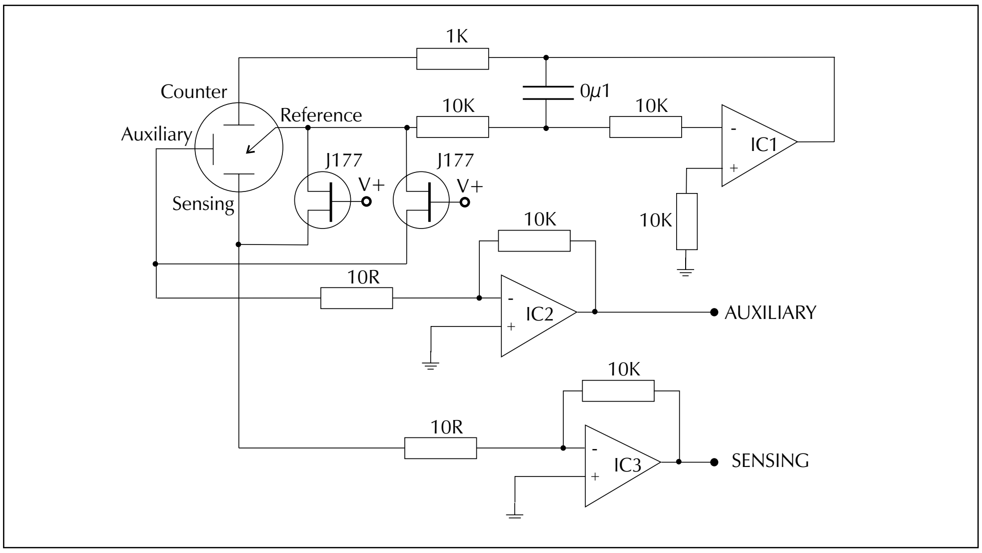
Circuitry required

The A3OZ EnviroceL differs from standard three electrode sensors by the introduction of a second working electrode, known as the **Auxiliary**. A suitable operating circuit is shown below.

Figure 1.
A3OZ Operating Circuit



IC1 - This amplifier should have either a low offset or have its offset nulled out. The PMI OP-77, OP-90, Intersil or Teledyne 7650, and Linear Technology LT1078 are all suitable.

IC2, IC3 - This amplifier acts as a current to voltage converter and its offset performance is less critical. The OP-77 or similar is a suitable choice

Recommended value of $\mathbf{R}_{load}$ is given in the specification overleaf.

When no gas is present, there is a small zero gas (baseline) signal from each electrode. Upon exposure to nitrogen dioxide/ozone, the *sensing* electrode produces a signal proportional to the concentration of gas. Virtually all the gas is reacted on contact with this electrode, so the *auxiliary* electrode remains largely unaffected and hence the signal remains at its baseline level. It can therefore be assumed the *auxiliary* signal is wholly attributed to the baseline.

The baseline signal of both electrodes is slightly affected by changes in atmospheric conditions (e.g. temperature). However as both are subject to the same conditions, any shift in baseline on the *sensing* electrode will be followed by a similar shift in the *auxiliary*. Hence by comparing the two signals any baseline changes may be compensated.

Evaluating the nitrogen dioxide/ozone concentration of a sample from the two signals is a straightforward subtraction:-.

Let:

I_S= *Sensing* electrode signal;
I_A=*Auxiliary* electrode signal;
I_{gas}=Baseline compensated nitrogen dioxide/ozone signal.

Then

$$I_{gas} = I_S - I_A$$